

Commonwealth of Kentucky
Division for Air Quality
EXECUTIVE SUMMARY

FINAL

Conditional Major, Construction

Permit: F-08-033

Lazar Anode Technologies LLC

Hawesville KY 42348

February 10, 2009

Vahid Bakhtiar, Reviewer

SOURCE ID:	21-091-00029
AGENCY INTEREST:	102130
ACTIVITY:	APE20080001

SOURCE DESCRIPTION:

The normal baking of anodes in the primary aluminum plant anode baking furnaces results in emissions of sulfur and fluoride compounds due to de-sulfurization and de-fluoridization of the green anodes as they cure in a chamber exposed to atmosphere. Lazar Anode Technologies, LLC has developed a new process to cure green anodes in a totally enclosed vertical column that is sealed to exposure to atmosphere. The new Lazar Anode Technologies process results in no de-sulfurization and no de-fluoridization since the fluoride and sulfur compounds in the green anode are at equilibrium with the packing coke inside the central heating chamber of the totally enclosed vertical furnace chamber. The new design for the anode bake is simply a double wall chamber. The inner chamber contains the green anodes and tightly packed-packing coke. The outer chamber is the combustion chamber where the energy from the "Fuel" is transferred from the outer ring to the sealed inner ring in the top or heating portion of the furnace, and the bottom of the furnace is a cooling section.

In principle, the green anodes are heated in the top of the furnace and cooled in the bottom portion of the furnace. The heating and cooling occurs in the absence of oxygen or exposure of the anodes/packing coke to atmosphere. This concept of heating and cooling the anodes in the absence of oxygen is the technical basis for the new process and results in the release of only trace amounts of organics, sulfur compounds, or fluoride compounds; unlike the traditional anode bake furnaces that release significant amounts of each of the above compounds.

The anode bakes are processed vertically in 10 stations with each process step taking 16 hours. The green anodes start at room temperature, go through a heating and baking cycle that brings the anode to 900-1200° C and cools it back down to room temperature at the bottom of the vertical furnace. The pressure in the sealed inside baking chamber is negative with respect to atmosphere. This negative pressure insures that the VOM release from heating the green anode cannot escape from the inner chamber at either to top or the bottom of the furnace chamber. The VOM is pulled out of the inner chamber at a point in the process where the interior temperature is approximately 200° C. The VOM released during heating of the green anode is withdrawn from the inner ring at a temperature zone where the sulfur compounds and the fluoride compounds will not be in the gaseous phase (200° C or lower). The VOM is then used as the "Fuel" to heat the outer combustion chamber

to 1200° C under normal operations. At this temperature in the outer ring combustion chamber, organics will be completely destroyed.

PUBLIC AND U.S. EPA REVIEW:

On December 25, 2008, the public notice on availability of the draft permit and supporting material for comments by persons affected by the plant was published in *The Hawesville Hancock Clarion* in Hawesville, Kentucky. In addition, notification of the issuance of the draft permit was sent to the U.S. EPA on December 9, 2008 via e-mail. The public comment period expired 30 days from the date of publication. No comments were received during this period. The permit is now being issued final.